

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY


(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 14 DEC 2005

WIPO

PCT

Applicant's or agent's file reference AWP63032WO00	FOR FURTHER ACTION See Form PCT/PEA/416	
International application No. PCT/GB2004/003304	International filing date (day/month/year) 02.08.2004	Priority date (day/month/year) 04.08.2003
International Patent Classification (IPC) or national classification and IPC B23G7/02		
Applicant ADCOCK TECHNOLOGY LIMITED et al.		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau) a total of 3 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>		
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>		
Date of submission of the demand 06.06.2005	Date of completion of this report 15.12.2005	
Name and mailing address of the International preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Breare, D Telephone No. +31 70 340-2168	



INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/GB2004/003304

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-6 as originally filed

Claims, Numbers

1-17 filed with telefax on 06.06.2005

Drawings, Sheets

1/2, 2/2 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/GB2004/003304

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-17
	No: Claims	
Inventive step (IS)	Yes: Claims	1-17
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-17
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

- 1.1 Reference is made to the following document:

D1: GB2324752, Richard Lloyd Ltd, 4 November 1998.

- 2.1 The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and shows (the references in parentheses applying to this document):

A tap adapted for formation of female screw-threads in a plurality of metal parts, each female screw-thread being capable of imparting translational motion to a threaded second member engaged therewith, the threaded second member having a matching male screw-thread and the translational motion occurring on relative rotation between the first metal part and the threaded second member, the tap being fluteless with a triangular form thread.

- 2.2 The subject-matter of claim 1 differs from this known tap in that the angle of thread is in the range 29° to 40° and that the crests are radiussed.

- 2.3 The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

- 2.4 The problem to be solved by the present invention may be regarded as providing a fluteless tap for tapping female threads that are optimised for providing translational movement.

- 2.5 The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

Although threads with the angle of thread in the range 29° to 40° are known in the art for providing translational movement (acme threads generally have an angle of thread of 29° to 30°), these threads are trapezoidal in nature. Triangular threads (which may also be used to convert rotational movement into translational movement, albeit with low efficiency) generally have an angle of thread in the range of 47° (BA series) to 60° (ISO unified and metric thread systems). A triangular female thread with triangular thread form having an angle of thread of between 29° and 40° with radiussed roots (corresponding to the radiussed crests of the tap claimed in claim 1)

is neither known from, nor rendered obvious by, the available prior art for the purpose of converting rotary motion into translational motion.

- 2.6 Claims 2-14 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.
- 2.7 Independent claim 15 relates to a product formed using the tap of claim 1. Since a triangular female thread with triangular thread form having an angle of thread of between 29° and 40° with radiussed roots is neither known from, nor rendered obvious by, the available prior art, the subject matter of this claim is also novel and inventive.
- 2.8 Independent claims 16 and 17 both relate to methods of use of the new and inventive tap claimed in claim 1. The subject matter of these claims is therefore also considered as novel and inventive for the reasons stated in paragraph 2.5 above.

-7-

CLAIMS

- 5 1. A tap (10) adapted for formation of female screw-
threads in a plurality of metal parts, each female screw-
thread being capable of imparting translational motion to
a threaded second member engaged therewith, the threaded
10 second member having a matching male screw-thread and the
translational motion occurring on relative rotation
between the first metal part and the threaded second
member, the tap (10) being fluteless and comprising a
threaded portion (23) with a triangular form thread,
characterised in that the triangular form thread has an
15 angle of thread (α) in the range 29° - 40° and radiussed
crests (16).
2. A tap (10) as claimed in claim 1 wherein the angle
of thread (α) is 29° to 31° .
- 20 3. A tap (10) as claimed in claim 2 wherein the angle
of thread (α) is 30° .
4. A tap (10) as claimed in any one of the preceding
25 claims wherein the tap (10) has a chamfered first end
(12-15).
5. A tap (10) as claimed in claim 4 wherein the
chamfered front end extends over at least four turns (12-
30 15) of the thread.
6. A tap (10) as claimed in claims 4 or 5 wherein the
chamfered front end (12-15) has a chamfer angle (β) in
the range 5.5° to 6.5° .
- 35 7. A tap (10) as claimed in any one of claims 1 to 6
which has at least two starts.

-8-

5 8. A tap (10) as claimed in any one of the preceding claims wherein the radiussed crests (16) have a radius of curvature in the range of 0.165 to 0.175 mm.

10 9. A tap (10) as claimed in any one of the preceding claims wherein the roots (17) of the threaded portion (23) of the tap (10) are radiussed.

15 10. A tap (10) as claimed in claim 9 when the radiussed roots (17) have a radius of curvature in the range 0.178 mm to 0.188 mm.

20 11. A tap (10) as claimed in any one of the preceding claims wherein the thread has a pitch of 0.995 mm to 1.005 mm.

12. A tap (10) as claimed in any one of the preceding claims comprising additionally lubrication grooves.

25 13. A tap (10) as claimed in any one of the preceding claims comprising a shank portion (24) extending rearwardly from the threaded portion (23) and a rearmost portion (25) with a plurality of flat surfaces to enable engagement of the tap by a chuck.

30 14. A tap (10) as claimed in claim 13 in which at least one of the flat surfaces is precision machined in order to precisely set a distance between the front of the tap (10) and at least one end of the flat surface.

35 15. A product having a tapped bore with a female screw-thread formed using the tap (10) claimed in any one of the preceding claims.

-9-

16. A method of tapping a product in which a female
5 screw thread is formed using a tap (10) as claimed in any
one of claims 1 to 14.

17. A method of manufacture and use of apparatus which
has a first metal object with a female screw-thread and a
10 second metal object with a matching male screw-thread,
the method comprising the steps of:

forming in the first metal object a female screw-
thread using a tap (10) as claimed in any one of claims 1
to 14;

15 forming on at least a part of the second metal
object a male screw-thread matching the female screw-
thread of the first metal object;

engaging the male screw-thread of the second metal
object with the female screw-thread of the first metal
20 object; and

rotating one of the first and second metal objects
relative to the other in order to occasion translational
motion of the second metal object relative to the first
metal object.

25 641614, AMP, CTF